

BORROW AREA MANAGEMENT AND RESTORATION PLAN

ON-SITE DISPOSAL FACILITY

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Prepared by

GeoSyntec Consultants

1100 Lake Hearn Drive, NE, Suite 200

Atlanta, Georgia 30342

Under

Fluor Daniel Fernald

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1.0 INTRODUCTION

1.1 Overview

This Borrow Area Management and Restoration (BAMR) Plan describes the management and restoration activities that will be undertaken for obtaining on-site borrow soils for construction, filling, and closure of the Fernald Environmental Management Project (FEMP) On-Site Disposal Facility (OSDF), Fernald, Ohio. These activities are conducted primarily at the East Field Borrow Area (borrow area) located south of the OSDF and east of the South Entrance Road. Borrow activities conducted within the footprint of the OSDF are also briefly described.

This plan addresses management and restoration activities at the borrow area throughout construction, impacted material placement, and closure of the OSDF, as prescribed in the “*Final Record of Decision for Remedial Actions at Operable Unit 2 (OU2 ROD)*” [DOE, 1995a]. The plan does not address maintenance activities beyond final restoration of the borrow area.

1.2 Project Description

The OSDF will be constructed to permanently contain impacted materials derived from remediation of the operable units at the FEMP. All material destined for OSDF disposal will be required to meet OSDF waste acceptance criteria (WAC). The estimated total volume of material destined for OSDF disposal is 2.5 million cubic yards (1.9 million cubic meters) bank/unbulked. Approximately 80 percent of this material is impacted soil, with the remainder consisting of building demolition rubble, fly ash, lime sludge, municipal solid waste, and small quantities of miscellaneous other materials.

The design approach for the OSDF is presented in the document, “*Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2*” [DOE, 1995b]. The design of the OSDF, as currently developed, is presented in the “*Final Design Package, On-Site Disposal Facility*” [GeoSyntec, 1997a]. The design of the OSDF includes a liner system, impacted material

placement, final cover system, leachate management system, surface-water management system, and other ancillary features.

The construction, impacted material placement, and closure of the OSDF is currently scheduled to occur over a period of approximately 7 years, as described in the Accelerated Remediation Plan. However, due to the potential for variations in the pace of remedial action activities, the OSDF has been designed to be constructed, filled, and closed in phases.

1.3 Plan Scope

The scope of this BAMR Plan is to identify the development, management, and restoration activities that the Subcontractor shall follow to ensure proper development of the borrow area in accordance with the design. Activities to be undertaken by the contractor before, during, and after borrow excavation occurs are discussed in this plan.

1.4 Plan Organization

The remainder of this BAMR Plan is organized as follows:

the design requirements applicable to this work plan are presented in Section 2;

a description of the borrow area is presented in Section 3.0;

borrow area operations are described in Section 4.0;

the borrow area sequence of development is contained in Section 5.0 and;

borrow activities at the OSDF footprint are described in Section 6.0.

1.5 Related Plans

Several other implementation plans have been prepared for the OSDF that contain information relevant to this BAMR Plan. Other plans of direct relevance to this BAMR Plan are listed below along with a brief statement of the relationship of the work plan to this plan:

OSDF Surface-Water Management and Erosion Control (SWMEC) Plan [GeoSyntec, 1997b]: provides details of temporary and permanent erosion and sediment controls and surface-water controls for the borrow area;

Final Design Package, On-Site Disposal Facility [GeoSyntec, 1997a]: provides project drawings and specifications that shall be followed during construction and;

OSDF Construction Quality Assurance (CQA) Plan [GeoSyntec, 1997c]: provides soil testing standards and frequencies that will be implemented to evaluate soils from the borrow area.

2.0 APPLICABLE REQUIREMENTS

2.1 Overview

Regulatory and other requirements applicable to the BAMR Plan are contained in the Design Criteria Package (DCP) for the OSDF. The DCP is contained within the overall OSDF Final Design Package [GeoSyntec, 1997a]. These requirements take the form of applicable or relevant and appropriate requirements (ARARs) and to be considered criteria (TBCs) as determined in by the record of decision for each of the various FEMP operable units, functional requirements, and general design criteria. There are no ARARs, TBCs, or functional requirements for the development of the borrow area. The general design criteria applicable to the BAMR Plan were obtained from the DCP.

2.2 General Design Criteria

The DCP identifies a number of general design criteria for the OSDF. The general design criteria that the Subcontractor shall meet in developing the borrow area:

The borrow area should be laid out in a manner that provides easy ingress and egress.

The borrow area shall be developed in a manner that requires minimal additional earthwork after borrow activities are complete to achieve the required restoration grades.

Restoration shall be performed progressively as work is completed in portions of the borrow area.

Erosion and sediment controls shall be implemented in the borrow area during construction and restoration.

The borrow area shall be developed in a manner that produces

consistent materials for construction of the OSDF and effectively utilizes the existing topography to control stormwater runoff and runoff.

Processing of borrow area soils shall be in accordance with the applicable requirements of the project specifications. Such processing includes moisture conditioning and screening.

Before the start of construction in the borrow area, the following activities shall be performed:

- establishment of temporary surface water management and erosion and sediment controls for the borrow area, including sediment basins;
- establishment of soil processing facilities (if any are needed).

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3.0 BORROW AREA DESCRIPTION

3.1 Existing Conditions

The borrow area is located in the southeast portion of the FEMP south of the OSDF. It is bounded to the north by the relocated North Entrance Road, to the west by the South Entrance Road, to the south by Willey Road, and to the east by an oil pipe line easement. The total plan area of the borrow area is approximately 50 acres (20 hectares).

The existing topography at the borrow area is relatively flat with surface elevations ranging from 606 ft. to 575 ft. Surface water flows generally from east to west along slopes ranging from approximately one to eight percent. Surface water runoff crosses the South Entrance Road via three reinforced concrete pipe culverts and discharges ultimately to Paddys Run.

Perched ground-water potentiometric surfaces in the borrow area range from approximately 5 ft. to 15 ft. (1.5 m to 4.6 m) below the existing ground surface. Perched ground water potentiometric levels may locally approach the ground surface after periods of heavy precipitation. Perched ground water is expected to be present in sand and gravel lenses below this potentiometric surface and to extend from these depths to below the proposed finished grades of the borrow area.

The existing vegetative cover at the borrow area consists of long grasses in good condition.

3.2 On-Site Borrow Material

3.2.1 Uses for Borrow Soils

Material excavated from the borrow area will be used to construct several components of the OSDF liner and final cover system as well as compacted fill used in construction of temporary and permanent roads and other site work applications. The components of the liner and final cover system to be constructed from borrow area materials are (from bottom to top):

compacted clay liner;

compacted clay cap; and

vegetative support layer.

The topsoil layer will be stripped from the borrow area and used for topsoil for the OSDF final cover system.

If needed, material from the borrow area will also be used to construct compacted fill, seasonal cover, the non-granular protective layer in the lining system and the contouring layer above the impacted materials, should sufficient volume of suitable impacted materials not be available for the construction of these components.

3.2.2 Description of Borrow Area Soils

The soil profile at the borrow area consists of a clay-loam topsoil layer overlying a 10- to 18-foot (3-m to 5.5-m) thick brown till layer, overlying a 10- to 20-ft. (3-6 m) thick gray till layer. Brown till will be used to construct the earthwork components of the OSDF discussed in the previous section. The brown till layer is a lean clay to sandy lean clay with the following properties and characteristics:

plasticity index (PI):	8 to 30
clay content:	12 to 48 percent
moisture content (in-situ):	10 to 28 percent
percent saturation:	86 to 100 percent
dry unit weight (in-situ):	102 to 130 lbs/ft ³

The plasticity index, clay content, and moisture content of the brown till tend to decrease with depth. The percent saturation and dry unit weight of the brown till tend to increase with depth. Geotechnical data obtained from previous field investigations conducted at both the borrow area and the OSDF are summarized in Appendix A.

Additional information on the geotechnical characteristics of the brown fill from the borrow area can be found in Parsons [1996].

It is anticipated that not all of the borrow area soils will be suitable for construction of the clay liner and/or clay cap. These unsuitable materials shall be separated as described in a later section of this plan and used in the construction of the other OSDF and cover system components or general site work construction previously described.

3.2.3 Borrow Soils

Prior to constructing any OSDF cells, brown till at the OSDF footprint shall be excavated to the required grade in accordance with Section 02200 of the technical Specifications. The depth of excavation to subgrade at the OSDF footprint ranges from zero to 15 ft. A small portion of this excavated material will be impacted material requiring disposal in the OSDF. The remaining portion of this material will be used for construction of the compacted clay liner, if suitable, or other applicable components of the OSDF. Although the OSDF footprint is not within the limits of the borrow area, the procedures for removing and handling the material is similar to those procedures for materials excavated from the borrow area. Borrow activities associated with the OSDF footprint are, therefore, discussed in this plan (Section 6).

This BAMR assumes that impacted soil is removed from within the OSDF footprint prior to the start of excavation by the Subcontractor. If it is decided that impacted material will be removed concurrently with cell construction, this BAMR Plan shall be amended to reflect changes or additional work necessitated by the concurrent activities.

4.0 BORROW AREA OPERATIONS

4.1 General

Borrow area operations include activities that occur prior to, during, and after excavation of the borrow materials. These activities are presented in detail in the following sections. At the time this BAMR Plan was prepared, no impacted areas have been identified in the borrow area; thus, impacted material removal is not discussed in this plan. Should impacted material be identified in the borrow area, this BAMR Plan will either be amended to reflect changes or additional work necessitated by the presence of the impacted material.

4.2 Erosion and Sediment Controls

Erosion and sediment controls that shall be implemented at the borrow area include silt fence, straw bale barriers, sediment basin, drainage channels, and vegetation. These controls shall be implemented as required by Section 6 of the Specifications and the *OSDF SWMEC Plan*. The erosion and sediment controls shall be implemented as required to effectively divert surface water runoff from active borrow sites within the borrow area, minimize sedimentation and erosion within the active borrow site, and collect and contain construction water within the area of active borrow. Erosion and sediment controls shall be established in the vicinity of each borrow site prior to the commencement of any soil disturbance in the borrow area.

The OSDF Subcontractor shall maintain the erosion and sediment controls in accordance with the Specifications and the *OSDF SWMEC Plan*.

4.3 Borrow Area Haul Road

The layout for the haul roads within the borrow area shall be planned prior to commencement of borrow activities. The Subcontractor may establish haul road layouts within the borrow area limits suitable for planned excavation sequence and for transportation of materials to the OSDF. Temporary drainage structures such as culverts and or drainage channels shall be established as

necessary so that surface water is not impounded in anyway by the haul road. Any temporary drainage structure utilized by the Subcontractor shall be in accordance with the Specifications and the *OSDF SWMEC Plan*.

The subcontractor shall maintain the haul roads within the borrow area and haul road to the OSDF cell construction. Once established, the borrow area haul roads shall be watered regularly for fugitive emissions control.

4.4 Clearing and Grubbing

Clearing and grubbing shall take place in areas that will be stripped for borrow activities. Clearing and grubbing shall be performed in accordance with Section 02110 of the technical Specifications. Disposal, stockpiling, or reuse of cleared and grubbed material shall also be in accordance with Section 02110.

4.5 Topsoil Removal and Stockpiling

Topsoil shall be stripped from the borrow area from an area no larger than 10 acres (4 ha). The stripped topsoil shall be stockpiled at the Subcontractor's work area at a location designated by the Construction Manager (CM) that is easily accessible by the Subcontractor for maintenance. Topsoil stockpiling and stripping shall be in accordance with Section 02110 of the technical Specifications. The stockpiled topsoil shall either be temporarily seeded in accordance with Section 02930 of the technical Specifications or covered with a tarp. If a tarp is used, it shall be sufficiently anchored with sandbags or tires to resist uplift.

4.6 Borrow Activities

Borrow activities shall begin in the vicinity of the sediment basin and proceed upgradient. Material shall be excavated from the borrow area and transported to either the point of construction or the Subcontractor's soil stockpile area. Suitability of borrow material for clay liner and clay cap will be established by the CM with the CQC Consultant performing conformance testing. It is the

responsibility of the Subcontractor to establish the suitability of all other borrow material for the proposed end use. The CQC Consultant will monitor and test soil used in construction for conformance with the Specifications based on the end use selected by the Subcontractor. Monitoring and testing by the CQC Consultant will be in accordance with the *OSDF CQA Plan*. The Subcontractor shall manage borrow materials in two separate stockpiles: one stockpile containing borrow material suitable for use as clay liner and clay cap, and one stockpile containing all other borrow material.

4.7 Borrow Area Restoration

As borrow activities continue, progressive restoration of the borrow area shall be implemented. As any active portion of the borrow area reaches final grade, it shall be permanently revegetated in accordance with Section 02930 of the Specifications. The maximum area of bare soil that may be exposed at any one time in the borrow area is 10 acres (4 ha). Once all portions of the borrow area within the contributory drainage area of a sediment basin are restored (*i.e.*, have established permanent vegetation), the sediment basin shall be decommissioned by removing the riser structure and 36-inch diameter portion of the culvert. The remaining 48-inch diameter culvert will remain as a permanent drainage structure. Decommissioning of the sediment basin shall be in accordance with the *OSDF SWMEC Plan*. Progressive restoration of the borrow area is discussed further in Section 5.0. Refer to Figure 5-1 for the approximate limits of the borrow area stages.

5.0 SEQUENCE OF DEVELOPMENT

5.1 General

The borrow area shall be developed in two major stages in a manner that effectively utilizes the existing topography to control stormwater runoff and runoff (see Figure 5-1). The dividing line between the two stages is an existing swale that crosses the borrow area in the east west direction located in the northern half of the borrow area. The area north of the existing swale represents the early stage of the borrow area and the area south of the existing swale represents the late stage of the borrow area. The development of these two stages are discussed further below.

5.2 Early Stage Development

The plan area of the early stage is approximately 21 acres (8 ha). The existing swale to the south of the early stage will intercept runoff before it enters the early stage area and direct it to the existing 30-inch (0.8-m) diameter culvert at the South Entrance Road. The sequence of development for the early stage of the borrow area shall be as presented below.

1. Erosion and sediment controls shall be implemented in the vicinity of sediment basin and to the west of the South Entrance Road where a drainage channel in the borrow area will be constructed.
2. Clearing, grubbing and topsoil stripping operations shall take place in the vicinity of the sediment basin. These materials shall be handled as described in Section 4.4 (clearing and grubbing), or Section 4.5 (topsoil), as appropriate.
3. Construction of sediment basin shall begin. Construction activities include: (i) excavating for the sediment basin and removing the excavated materials as described in Section 4; (ii) excavating the culvert trench beneath the South Entrance Road (iii) seeding the base and side slopes of the sediment basin.

4. Concurrently with the construction of the sediment basin, an area suitable for establishing a soil processing operation, if needed, shall be established as described in Section 4.7.
5. The layout of the borrow area haul roads shall be planned and erosion and sediment controls shall be implemented in the vicinity of the haul roads and location of the first borrow site [not to exceed 10 acres (4 ha)] within the early stage of the borrow area.
6. Clearing, grubbing, and topsoil stripping of the borrow site shall occur as described in Section 4.4 (clearing and grubbing), or Section 4.5 (topsoil), as appropriate.
7. Borrow operations shall begin. Excavated material shall be hauled and stockpiled as described in Section 4.6. Excavation grades shall be established such that positive drainage to the sediment basin is maintained.
8. Throughout excavation operations, the Subcontractor shall maintain erosion and sediment controls.
9. As final grades are reached within the active borrow site, the finished areas shall be promptly revegetated. Topsoil need not be placed over finished grades in cut areas but the finished subgrade shall be prepared in accordance Section 02930 of the Specifications.
10. As final grades are approached throughout the first active borrow site, and vegetation has been established over much of the site, the next borrow site within the early stage shall be planned, and Step Nos. 7 through 11 above shall be implemented for each subsequent borrow site within the early stage of the borrow area.

5.3 Late Stage Development

The plan area of the late stage is approximately 29 acres (12 ha). The finished grades of the early stage developed previously will direct stormwater runoff from the early stage away from the later stage. The sequence of development for the late stage of the borrow area shall be as presented below.

1. The layout of the borrow area haul roads shall be planned and erosion and sediment controls shall be implemented in the vicinity of the haul road and location of the first borrow site [not to exceed 10 acres (4 ha)] within the late stage of the borrow area. The Subcontractor shall minimize erosion and/or sedimentation in the completed early stage of the borrow area.
2. Clearing, grubbing, and topsoil stripping of the borrow site shall occur as described in Section 4.4 (clearing and grubbing), or Section 4.5 (topsoil), as appropriate.
3. Borrow operations shall begin. Excavated material shall be hauled and stockpiled as described in Section 4.6. Excavation grades shall be established such that positive drainage to relevant erosion and sediment controls is maintained.
4. Throughout excavation operations, the Subcontractor shall maintain erosion and sediment controls.
5. As final grades are reached within the active borrow site, the finished areas shall be promptly revegetated. Topsoil need not be placed over finished grades in cut areas, but the finished subgrade shall be prepared in accordance with Section 02930 of the Specifications.
6. As final grades are approached throughout the first active borrow site, and vegetation has been established over much of the site, the next borrow site within

the late stage shall be planned, and Step Nos. 2 through 10 above shall be implemented for each subsequent borrow site within the late stage of the borrow area.

7. Once final grades are obtained throughout the late stage of the borrow area, and vegetation has been established over the entire late stage. The sediment basin shall be decommissioned in accordance with the *OSDF SWMEC Plan*.

6.0 BORROW ACTIVITIES AT THE OSDF FOOTPRINT

As discussed in Section 3.2.3, zero to 15 feet (0 to 4.6 m) of material will generally be removed from the OSDF foot print during excavation to OSDF cell subgrade elevation. The excavated material shall be used for construction of the compacted clay liner, if suitable, or other applicable components of the OSDF. The construction activities associated with this excavation are similar to those within the borrow area and are briefly described below.

Erosion and sediment controls, including sediment basins, shall be implemented in accordance with Section 02270 of the Specifications and the *OSDF SWMEC Plan*. Excavated materials shall be hauled to the point of construction or the soil stockpile area. Borrow activities shall be as described in Section 4.6 of this plan. It is anticipated that the Subcontractor will, to the extent possible, use excavated material from the OSDF footprint to construct compacted fill and compacted clay liner prior to obtaining material from the borrow area.

7.0 REFERENCES

GeoSyntec Consultants, “*Final Design Package*,” Fernald Environmental Management Project, DOE Fernald Area Office, Fernald, OH, 1997a.

GeoSyntec Consultants, “*OSDF Surface-Water Management and Erosion Control Plan*,” Fernald Environmental Management Project, DOE Fernald Area Office, Fernald, OH, 1997b.

GeoSyntec Consultants, “*OSDF Construction Quality Assurance Plan*,” Fernald Environmental Management Project, DOE Fernald Area Office, Fernald, OH, 1997c.

Parsons, “*Geotechnical Investigation Report, On-Site Disposal Facility, Operable Unit 2, Project Order 140, Revision 0*,” prepared for FERMCO for the Fernald Environmental Management Project, Subcontract No. 2-21487, December, 1995.

Parsons, “*Preliminary Results of Borrow Area Sampling and Testing Program*.”

U.S. Department of Energy (DOE), “*Final Record of Decision for Remedial Actions at Operable Unit 2*,” Fernald Environmental Management Project, DOE Fernald Area Office, Fernald, OH, 1995a.

U.S. Department of Energy (DOE), “*Final Remedial Design Work Plan for Remedial Actions at Unit 2*,” Fernald Environmental Management Project, DOE Fernald Area Office, Fernald, OH, 1995b.

APPENDIX A

GEOTECHNICAL DATA

BROWN TILL SOIL DATA

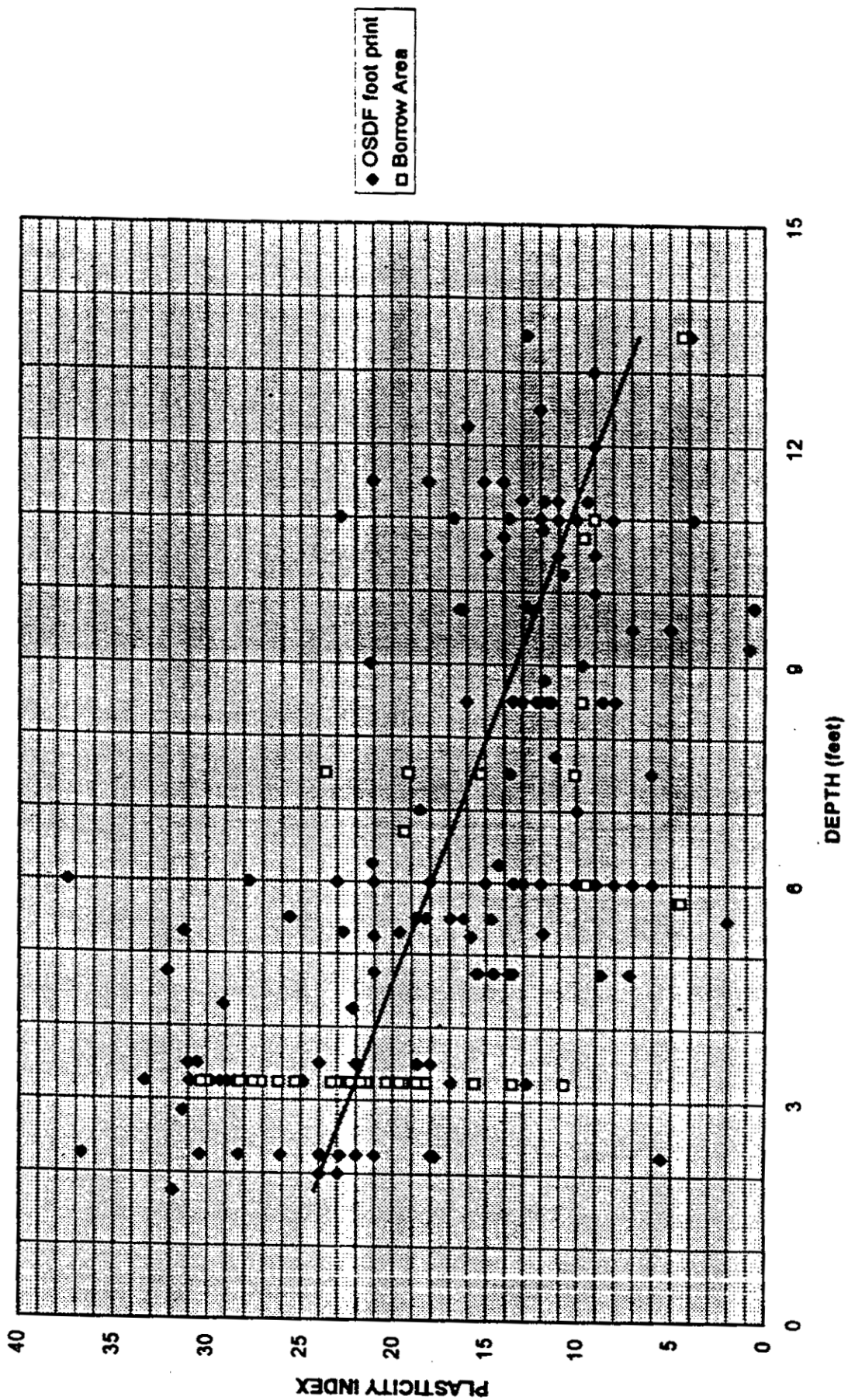
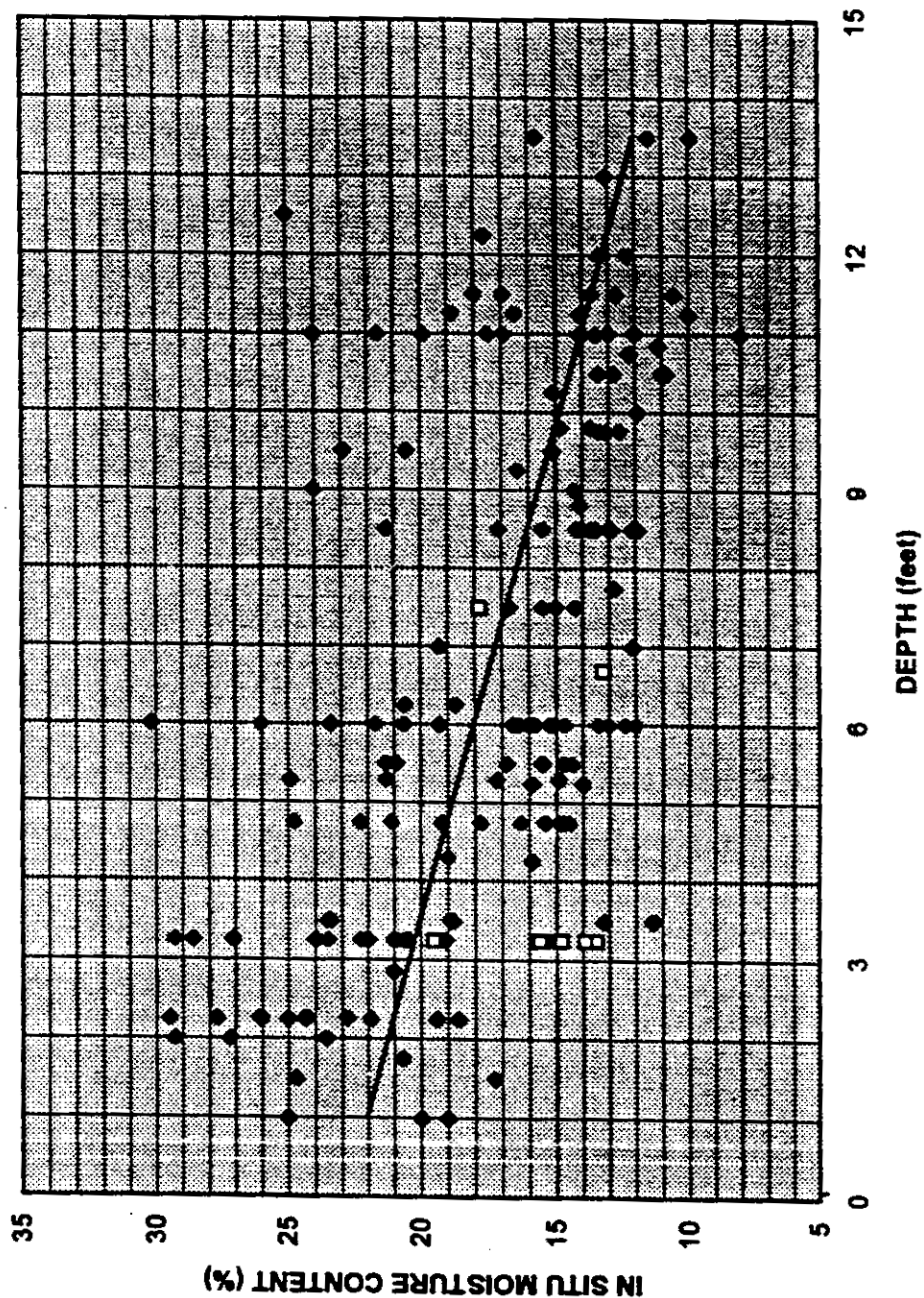


Figure 1. Brown Till Soil Plasticity Index Data

[data obtained from Parsons, et al. 1996]

BROWN TILL SOIL DATA



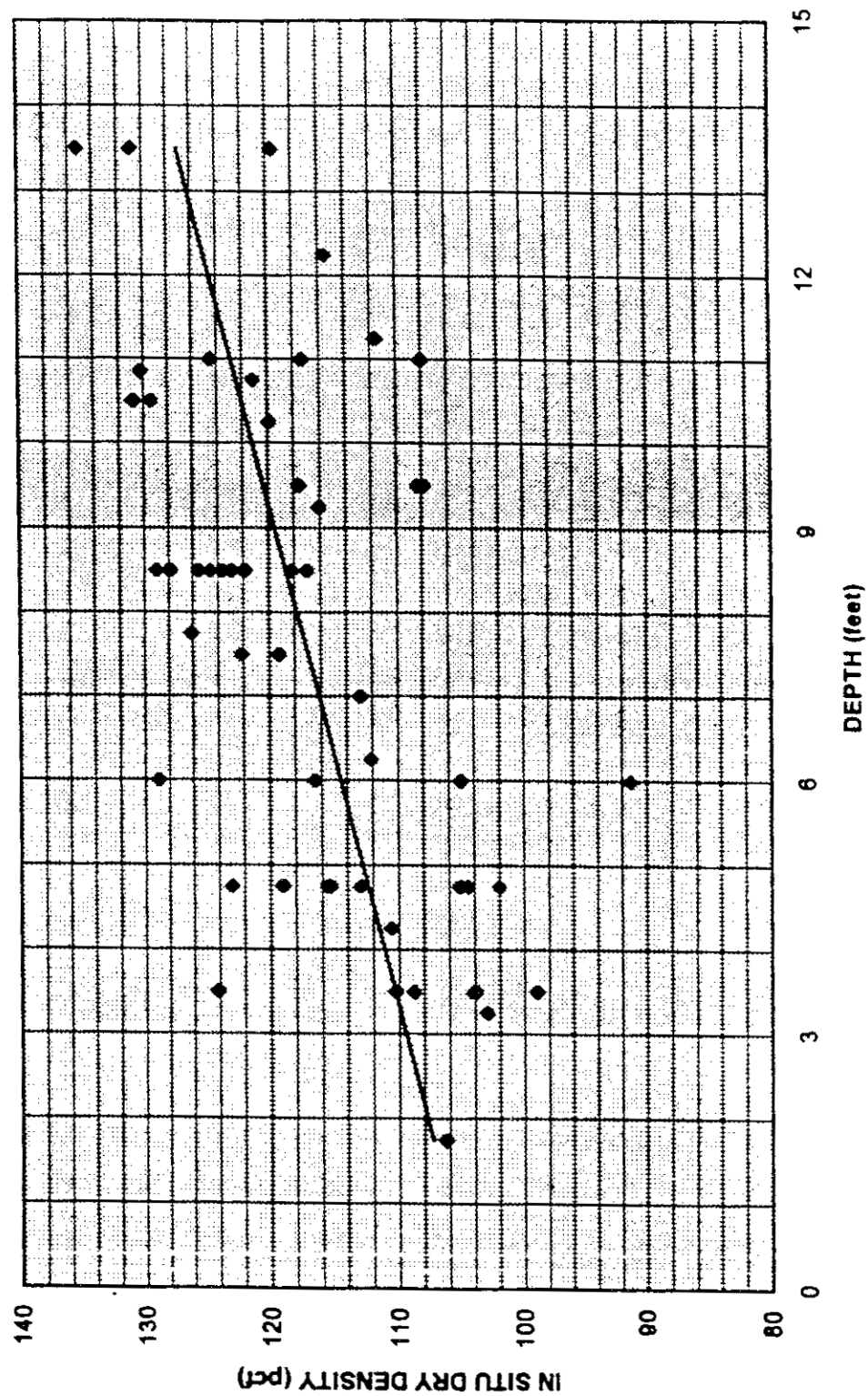
◆ OSDF foot print
□ Borrow Area

Figure 3. Brown Situ Moisture Content Data

[data obtained from]

1995 and 1996]

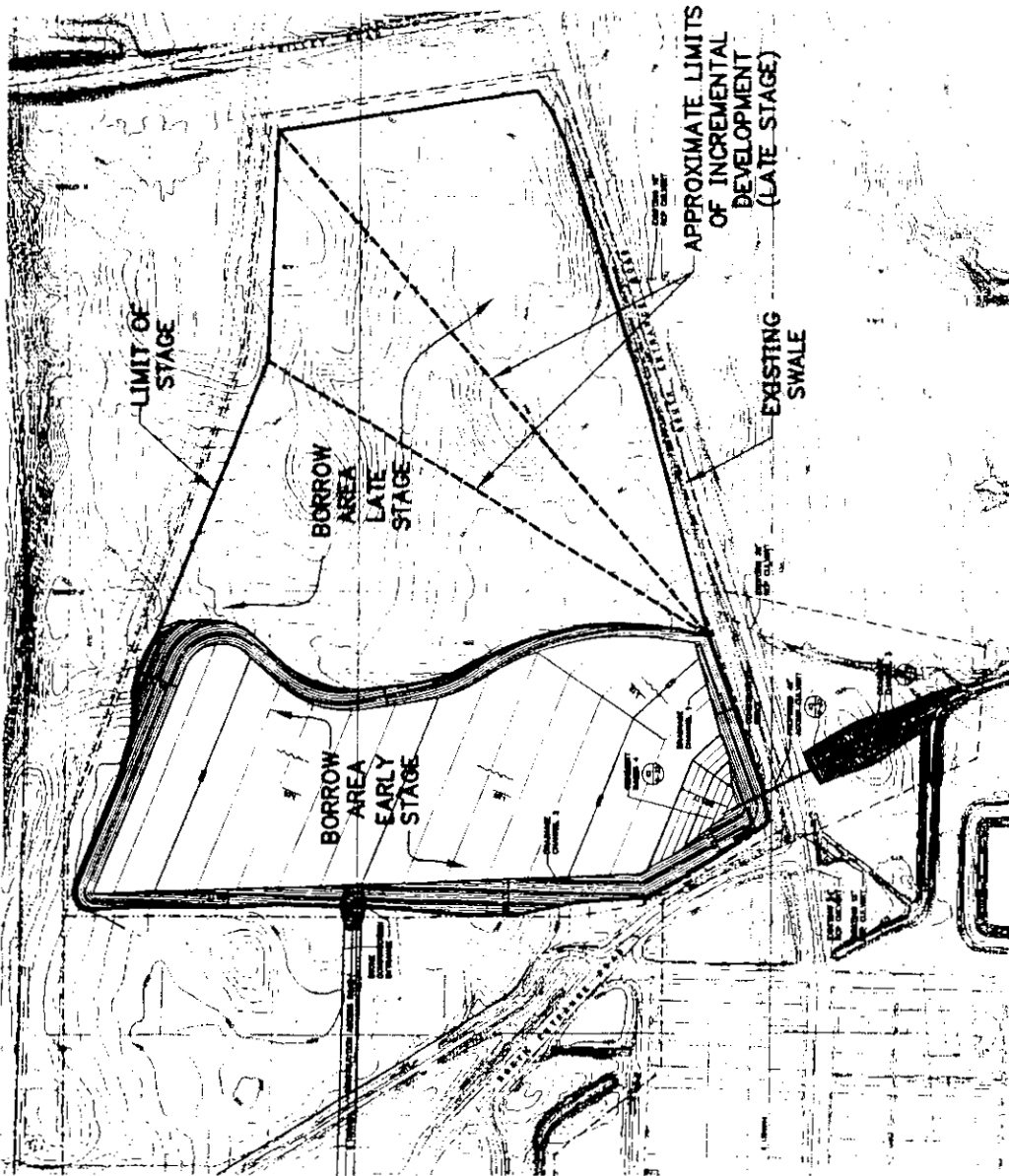
BROWN TILL SOIL DATA



◆ OSDF foot print

Figure 5. Brown Till In Situ Dry Density Data

[data obtained from Parsons, 1995]



LEGEND

---	500	EXISTING GROUND ELEVATION (FEET)
---	570	FINISHED GRADE ELEVATION (FEET)
---		BATTERY LIMIT
---		FEMP PROPERTY LINE
---		DRAINAGE FLOW DIRECTION
---		DRAINAGE CHANNEL
---		LIMIT OF BORROW AREA

0 300
SCALE IN FEET

NOTES:

1. SEQUENCE OF CONSTRUCTION FOR BORROW AREA EARLY STAGE IS PRESENTED IN BORROW AREA MANAGEMENT AND RESTORATION (BAMR) PLAN
2. DEVELOP BORROW AREA SO THAT, TO THE EXTENT POSSIBLE, RUNOFF FROM THE AREAS BEING DEVELOPED DRAINS TO SEDIMENT BASIN 4 AND RUNOFF FROM AREAS TO BE DEVELOPED IN THE FUTURE DRAINS TO THE EXISTING SWALE ON THE WEST SIDE OF THE SOUTH ENTRANCE ROAD



GEOSYNTEC CONSULTANTS

ATLANTA, GA

PROJECT NO.	GF 3900	FIGURE NO.	5-1
DOCUMENT NO.		FILE NO.	F96-G010